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*A New Era in International Technical Communication:
American-Russian Collaboration*

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Madelyn Flammia
University of Central Florida
Orlando, Florida

NASA-TM-109336 19940011365

Rebecca O. Barclay
Rensselaer Polytechnic Institute
Troy, New York

Thomas E. Pinelli
NASA Langley Research Center
Hampton, Virginia

Michael L. Keene
University of Tennessee
Knoxville, Tennessee

Robert H. Burger
University of Illinois at Urbana-Champaign
Urbana, Illinois

John M. Kennedy
Indiana University
Bloomington, Indiana



NASA

National Aeronautics and Space Administration

Department of Defense

INDIANA UNIVERSITY

A New Era in International Technical Communication: American-Russian Collaboration

Madelyn Flammia
Rebecca O. Barclay
Thomas E. Pinelli
Michael L. Keene
Robert H. Burger
John M. Kennedy
(407) 281-8561

English Department
University of Central Florida
Orlando, FL 32816

Until the recent dissolution of the Soviet Union, the Communist Party exerted a strict control of access to and dissemination of scientific and technical information (STI). This article presents models of the Soviet-style information society and the Western-style information society and discusses the effects of centralized governmental control of information on Russian technical communication practices. The effects of political control on technical communication are then used to interpret the results of a survey of Russian and U.S. aerospace engineers and scientists concerning the time devoted to technical communication, their collaborative writing practices and their attitudes toward collaboration, the kinds of technical documents they produce and use, their views regarding the appropriate content for an undergraduate technical communication course, and their use of computer technology. Finally, the implications of these findings for future collaboration between Russian and U.S. engineers and scientists are examined.

Introduction

Until the recent dissolution of the Soviet Union, the Communist Party maintained strict control over the intranational and international dissemination of scientific and technical information (STI). Russian engineers and scientists worked within a highly centralized political system characterized by secrecy and distrust. This system actively restricted communication between Russian engineers and scientists and their professional counterparts both at home and abroad.

Although recent sweeping political changes may free up the flow of STI within the former Soviet Union, it would be a mistake to discount the working environment that has prevailed in Soviet science since 1917 [Ref. 1, p. 148]. Information flow and the use of products, services, and technologies for acquiring, producing, using, and disseminating STI have traditionally been constrained by government policies formulated to maintain order and control [Ref. 2, p. 537]. It will take time before the effects of an easing of restrictions on the communication of STI are felt by and can influence the practices of Russian engineers and scientists.

In addition to a sociopolitical climate that has hampered the flow of STI, infrastructural obstacles to free and open communication exist, such as the poor quality of Russian telecommunications and severe shortages of basic supplies. Reports on the current state of the Russian economy indicate that such problems can only be addressed gradually. Therefore, information on the sociopolitical and economic climate over the last few decades is relevant when assessing the technical communication practices of engineers

and scientists whose education and careers have been shaped by the highly centralized character of the Communist Party's rule.

In order to learn more about international technical communication practices, the NASA/DoD Aerospace Knowledge Diffusion Research Project is examining how aerospace engineers and scientists find and use STI. This 4-phase research project is a joint effort of the Indiana University Center for Survey Research and the NASA Langley Research Center. The project is providing information on the flow of scientific and technical information at the individual, organizational, national, and international levels that should prove useful to R&D managers, information managers, and others concerned with improving access to and use of STI [3]. Studies for Phase 4 have been conducted in the Union of Socialist Republics (the former Soviet Union), Israel, Japan, and several Western European countries to examine the information-seeking behaviors of non-U.S. aerospace engineers and scientists.

The Russian study offers the unique opportunity to examine the influence of the past regime at a time when Russia is opening up to international communication and freer exchange of STI. The former Soviet Union is beginning to play a greater role in the international scientific community, particularly in the area of joint commercial ventures [4, 42]. For example, Krunichev Enterprise, the Russian firm that developed the Proton launch vehicle, and Lockheed Missiles and Space, a subsidiary of the Lockheed Corporation, recently announced a joint venture to pursue work in the international commercial satellite market [5]. The findings of this study, therefore, may hold particular interest for the American engineers, scientists, and technical communicators who will find themselves working on joint projects with their Russian counterparts in the not-so-distant future.

Although considerable research has been done on Soviet science and technology policy and education, few studies have focused closely on the types of documents used and produced by engineers and scientists or on the level and nature of collaboration involved in the production of scientific and technical documents. A wide range of sources, including reports from emigre scientists, indicates that two key factors have influenced Russian technical communication: 1) severe restrictions on the dissemination of STI and 2) limited computing facilities.

In this article we present Soviet and Western-style information models and discuss the characteristics of research and development (R&D) in the Soviet Union to provide a conceptual framework for understanding the differences between technical communication patterns in Russia and the U.S. We believe that Soviet centralized control of information has played a key role shaping the communication behaviors of Russian engineers and scientists. Next we examine the results of our survey of Russian and U.S. aerospace engineers and scientists in the light of what we have learned about information control in the former Soviet Union. Finally, we discuss the implications of our findings for future Russian-American collaboration in science and technology.

Models of Soviet and western-style communications

In examining the national presence of information technologies in the Soviet Union and the West, Goodman presents comparative models of "information societies" [6,15]. Information in general and STI in particular has been viewed in the Soviet Union as a means of achieving centrally formulated goals that include increased industrial productivity, support of military and internal security needs, and improved economic planning and control mechanisms. The driving forces behind Soviet goals have been national level political processes and Western achievements. The systemic conditions underlying information production, transfer, and use include a leadership that distrusts the general population, a strong form of centralized planning and control, government controls on access to and dissemination of information, and powerful national-level controls on social change. Communication and computing capabilities remain modest and narrowly related to specific, government-mandated goals.

In the West in general and in the U.S. in particular, information is regarded as commodity, and information technologies are viewed as part of a large number of products, services, and processes to be distributed throughout society. Driving forces in the West include push-pull markets, domestic and international competition, and inherent opportunities for innovations in information technologies. Systemic conditions in the West support the broad dissemination of controls for economic efficiency, private activities, and more communications of all kinds. National controls on access to and dissemination of information in general and STI in particular are relatively weak, and there is little, if any, national level control of social change. The West exhibits technological strength and interest in all areas of communication and computing and has a near universal user community.

International data collection and reporting

This article presents selected results from Russian and U.S. studies. Demographic data, followed by data dealing with time spent communicating technical information, collaborative writing practices, workplace use and production of technical communications, appropriate course content for an undergraduate course in technical communications, and use of computer technology, were examined.

Given the limited purposes of this exploratory study, the overall response rates, and the research designs, no claims are made regarding the extent to which the attributes of the respondents in the studies accurately reflect the attributes of the populations being studied. A much more rigorous research design methodology would be needed before any claims could be made. Nevertheless, the findings of the studies do permit the formulation of the following general statements regarding the technical communications practices of the aerospace engineers and scientists who participated in the two studies:

1. The ability to communicate technical information effectively is important to Russian and U.S. aerospace scientists and engineers.
2. As the Russian and U.S. aerospace engineers and scientists in these studies have advanced professionally, the amount of time they spend producing and working with technical communications has increased for more than one-third (38%) of the Russian respondents and more than two-thirds (68%) of the U.S. respondents.
3. The Russian and U.S. aerospace engineers and scientists in these studies write more frequently in small groups than they write alone, although they do not necessarily find collaborative writing more productive than individual writing. Both groups of respondents frequently produce the same types of materials whether they write as members of a group or as individuals.
4. The U.S. aerospace engineers and scientists in these studies make use of personal knowledge and discussions with colleagues within and outside their organization for solving technical problems. However, the Russian respondents appear to rely on co-workers or people within the organization and literature resources found within the organization's library.
5. Approximately 25% of the Russian and 71% of the U.S. aerospace engineers and scientists in these studies had taken a course in technical communications; a majority of both groups indicated that such a course had helped them communicate technical information.
6. Although the percentages vary for each item, there was considerable agreement among the Russian and U.S. aerospace engineers and scientists in these studies regarding the on-the-job communications to be included in an undergraduate technical communications course for aerospace and science students and less agreement on the appropriate principles and mechanics that should be included in such a course.
7. Although important to both Russian and U.S. aerospace engineers and scientists, libraries and technical information centers were used more by the Russian respon-

- dents. More Russian aerospace engineers and scientists had a library or technical information center located in their building than did their U.S. counterparts.
8. More U.S. respondents used computer technology to prepare technical information than did their Russian counterparts and a larger percentage of the U.S. than Russian respondents indicated that computer technology had increased their ability to communicate technical information.
 9. U.S. aerospace engineers and scientists made greater use of computer software than did their counterparts.
 10. There were substantial differences between the two groups in terms of the information technologies presently being used and those that might be used in the future.

Implications for further research

In the near future American engineers, scientists, and technical communicators may well be faced with the challenge of working in conjunction with their Russian counterparts. We are likely to see cooperative Russian and U.S. space programs and joint commercial ventures between Russian and U.S. aerospace companies. To maximize the opportunities for scientific exchange and technology transfer, we must understand the environment of severe limitations and secrecy that our Russian colleagues have worked in for so long.

Further research must be done on the nature of technical communication in Russia if international collaborative efforts are to succeed. Specifically, it is important to learn more about the information-seeking and producing behavior of Russian engineers and scientists. How are their collaborative groups structured, and how are roles assigned? Is a concurrent or vertical model used for collaboration? Why is collaborative work believed to be more effective? Because of political and social pressures? Or because of intrinsic aspects of the collaborative experience? Further research in this area will be valuable to both educators and practitioners. What technical information services are available to Russian engineers and scientists? Is technical editing available and, if so, what kind of editing cycle is used. We know that shortages of paper and strict limitations on the dissemination of information have affected the reporting of STI in Russia. Because the Russian aerospace engineers and scientists in this study do not place the same emphasis on audience analysis that their U.S. counterparts do, would they be likely to make a document longer out of concern for their audience's understanding?

Russian aerospace accomplishments are noteworthy in light of the political restrictions, limited access to STI, and shortages of resources that engineers and scientists have faced. Popovsky bemoaned the loss to the international scientific community when Russians were kept from full participation [7, 114]. We stand on the brink of a new era of international technical communication when many gains will be made from freer exchange of STI.

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